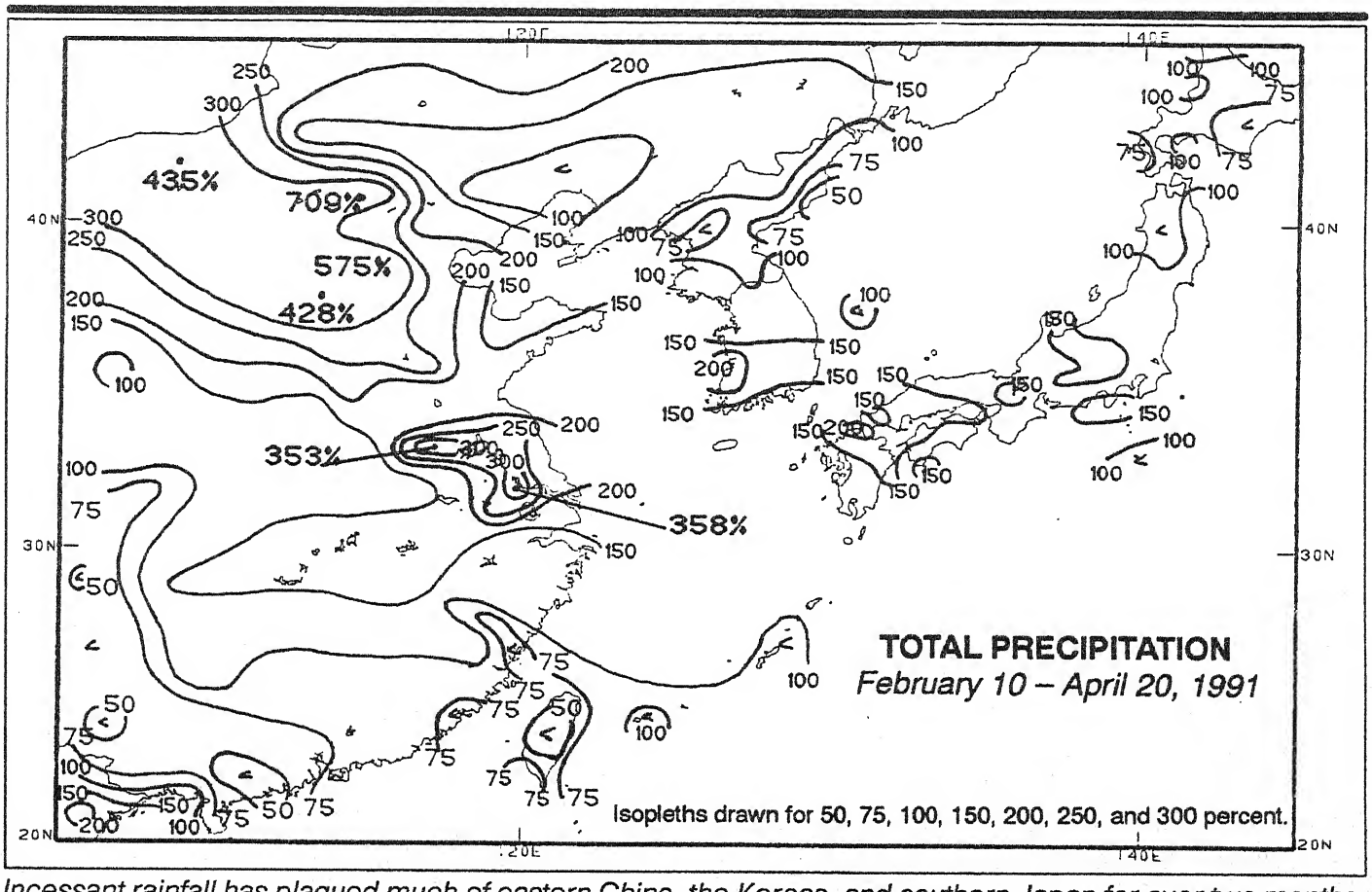
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 91/16 Washington, DC April 20, 1991



Incessant rainfall has plagued much of eastern China, the Koreas, and southern Japan for over two months. During February 10 - April 20, 1991, rainfall totals ranged from 15-100 mm across typically drier regimes in the northwestern corner of the map (i.e., through central Inner Mongolia) to 500-600 mm in portions of southwestern Japan and interior east-central China (southwest of Shanghai). Moisture surpluses over 100 mm accumulated across the southern half of Japan, southern South Korea, and much of east-central China, reaching 250-345 mm in the southern Tokyo suburbs, extreme southern Shikoku, portions of north-central Kyushu, and the western Shanghai suburbs. In contrast, unusually light rains fell on Taiwan and central and south-central China, where some locations measured less than half the normal rainfall.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two–week temperature anomalies.*
- *Global four–week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three–month precipitation anomalies (once a month).*
- *Global twelve–month precipitation anomalies (every three months).*
- *Global three–month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

Major Climate Events and Anomalies as of April 11, 1992

1. Western United States:

WARM WEATHER SHIFTS SOUTHWARD.

Readings approached 30°C in spots as temperature averaged up to 5°C above normal in Arizona and 6°C above normal in Colorado. Farther north, below normal temperatures ended the warm spell across Washington, Idaho, and Montana [Ending at 18 weeks].

2. Southern Texas:

DRIER CONDITIONS BRING RELIEF.

Up to 75 mm of rain dampened some locations along the Gulf Coast, but amounts were generally less than 10 mm farther north. Since early March, nearly 100 mm more than normal precipitation has fallen on some areas [Ending at 26 weeks].

3. Ecuador and Peru:

RAINS EASE UP.

Only scattered locations received 50 to 150 mm of rain as dry weather provided some relief. Since early March, surpluses of 175 to 320 mm have accumulated [Ending at 5 weeks].

4. Northwestern Africa:

COLD AND WET CONDITIONS DEVELOP.

Temperatures averaged as much as 8°C below normal across northern parts of Algeria and Morocco as 50 to 100 mm of rain drenched most areas [6 weeks].

5. Middle East:

COLD POCKETS REMAIN.

Although most of the Middle East reported above normal temperatures, Iran and the east-central Arabian Peninsula reported weekly departures reaching -5°C [Ending at 20 weeks].

6. Southern Africa:

HOT AND DRY CONDITIONS PERSIST.

Temperatures averaged up to 5°C above normal in northeastern South Africa as abnormally warm weather continued [11 weeks]. Exceptionally dry conditions also remained intact as less than 20 mm of rain fell. Moisture deficits since early March reached nearly 220 mm at some locations. Since the beginning of the rainy season (Oct. 1, 1991), precipitation shortfalls of up to 720 mm have accumulated in southeast Zimbabwe [6 weeks].

7. Southern India and Sri Lanka:

MORE DRY WEATHER.

Little or no rain was again reported as six-week rainfall deficits climbed to 190 mm [10 weeks].

8. Eastern China, Korea, Taiwan, and Western Japan:

SOAKING RAINS CONTINUE.

More torrential downpours plagued the region. Several locations received 200 to 450 mm of rain during the week. Six-week surpluses of 200 to 400 mm were common, with Hong Kong receiving 630 mm more than normal since early March [10 weeks].

9. Southeastern Asia, Northern Borneo, and the Philippines:

DRYNESS SPREADS.

Unusually dry weather spread across Thailand, Cambodia, and Vietnam as little or no rain fell. Across northern Borneo and the Philippines, below normal precipitation was also the rule, with amounts generally less than 15 mm [15 weeks].

10. Southwestern Australia:

HEAVY RAINS INUNDATE AREA.

Precipitation amounts of 30 to 90 mm drenched the area which combined with persistently above normal precipitation during the past few weeks to generate moisture surpluses of up to 150 mm since early March [6 weeks].

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS
FOR THE WEEK OF APRIL 5–11, 1992

e first full week of April featured both spring–like and -like weather for much of the eastern half of the nation. An eek blast of Arctic air produced more than a dozen record om the Deep South to the mid–Atlantic as readings dipped freezing as far south as Georgia. Wintry conditions also ed from the extreme northern Plains eastward to New d. More than 6 inches of snow blanketed parts of sota, Michigan, and Vermont. In sharp contrast, unusually weather enveloped the central and southern Plains and ed eastward, providing some of the warmest conditions for tern U.S. so far this Spring. Temperatures exceeded 80°F as rth as South Dakota and rose above 90°F in the Rio Grande . Several daily record highs were established on Friday and lay from the lower Mississippi Valley to the mid–Atlantic as gs approached 90°F in Kentucky, West Virginia, and ia. Elsewhere, strong thunderstorms generated heavy rain, amaging winds, and numerous tornadoes across the southern , Midwest, and Southeast. Nearly 5 inches of rain soaked do, FL while nearly 3 inches drenched Galveston, TX. Heavy lso soaked coastal Oregon, with nearly two inches measured gene on Thursday. In Alaska, blizzard conditions buffeted ns of the Arctic Coast while Nome recorded the first pitation–free day on Tuesday after a record 30 consecutive with measurable rain or snow.

The week unfolded with record cold conditions gripping ons of the Deep South and mid–Atlantic. Nearly a dozen daily d lows were set from Alabama to New Jersey on Sunday. By lay, the cold weather had migrated to the east, producing st half a dozen daily record lows from Georgia to West nia. Elkins, WV reported a low of 19°F. Elsewhere, a storm m tracked across the southern tier of states, generating heavy hail, and damaging winds. Heavy rain soaked southeastern s while strong thunderstorm wind gusts downed trees and r lines in Louisiana. Farther north, unusually warm weather ly enveloped the central Plains, with temperatures soaring e 80°F as far north as South Dakota. In contrast, unseasonably and tranquil conditions prevailed in the Pacific Northwest. rd lows were observed at a few locations in Oregon and hington as readings dipped into the twenties.

During the last half of the week, severe weather erupted across outhern Plains, Deep South, and Ohio Valley while heavy blanketed parts of the upper Midwest and Great Lakes. ng storms brought heavy rain, baseball size hail and wind gusts ning 70 mph from the southern Plains to the Midwest on Wednesday. Nearly a dozen tornadoes touched down in Texas and Oklahoma. Farther east, a warming trend commenced as highs in the eighties produced nearly a dozen daily records from Indiana to Virginia. Meanwhile, wintry conditions prevailed from the upper Midwest eastward through the Great Lakes as a low trekked across southern Canada and its trailing cold front pushed across the northern U.S. Up to a foot of snow blanketed parts of Wisconsin before eventually spreading into western New England. Farther west, heavy rain soaked the northern half of the West Coast as more than 2 inches of rain fell on several locations in Oregon as a storm system pushed ashore.

According to the River Forecast Centers, the greatest weekly precipitation totals (between two and four inches) fell on southeastern Texas, central Florida, western Oregon, and scattered locations in the east–central Plains, middle Mississippi Valley, southern Appalachians and Piedmont, northern New York, and eastern Hawaii (Table 1). Light to moderate amounts were recorded across New England, the Mississippi, Tennessee and Ohio Valleys, the Appalachians, the southern Plains, the remainder of Florida, the northern Intermountain West, and the northern half of the West Coast. Little or no precipitation fell in the mid–Atlantic, the northern and central Plains, the Rockies, the Southwest, the Great Basin, the southern half of California, Alaska, and the remainder of Hawaii. Portions of the eastern Ohio Valley, central Appalachians, and mid–Atlantic have yet to completely recover from the moisture deficits that began accumulating as the 1991 growing season commenced (Figure 1).

Unusually warm conditions dominated the middle of the country from the mid–Atlantic to the West Coast with departures between +8°F and +12°F common across the central Plains westward to the Great Basin. Temperatures averaged 3°F to 7°F above normal across the mid–Atlantic, the Ohio and Tennessee Valleys, and most of the Mississippi Valley, southern Plains, and from the Rockies through the Southwest and across California. In Alaska, abnormally mild weather covered the western half of the state, where weekly departures reached +10°F at Nome.

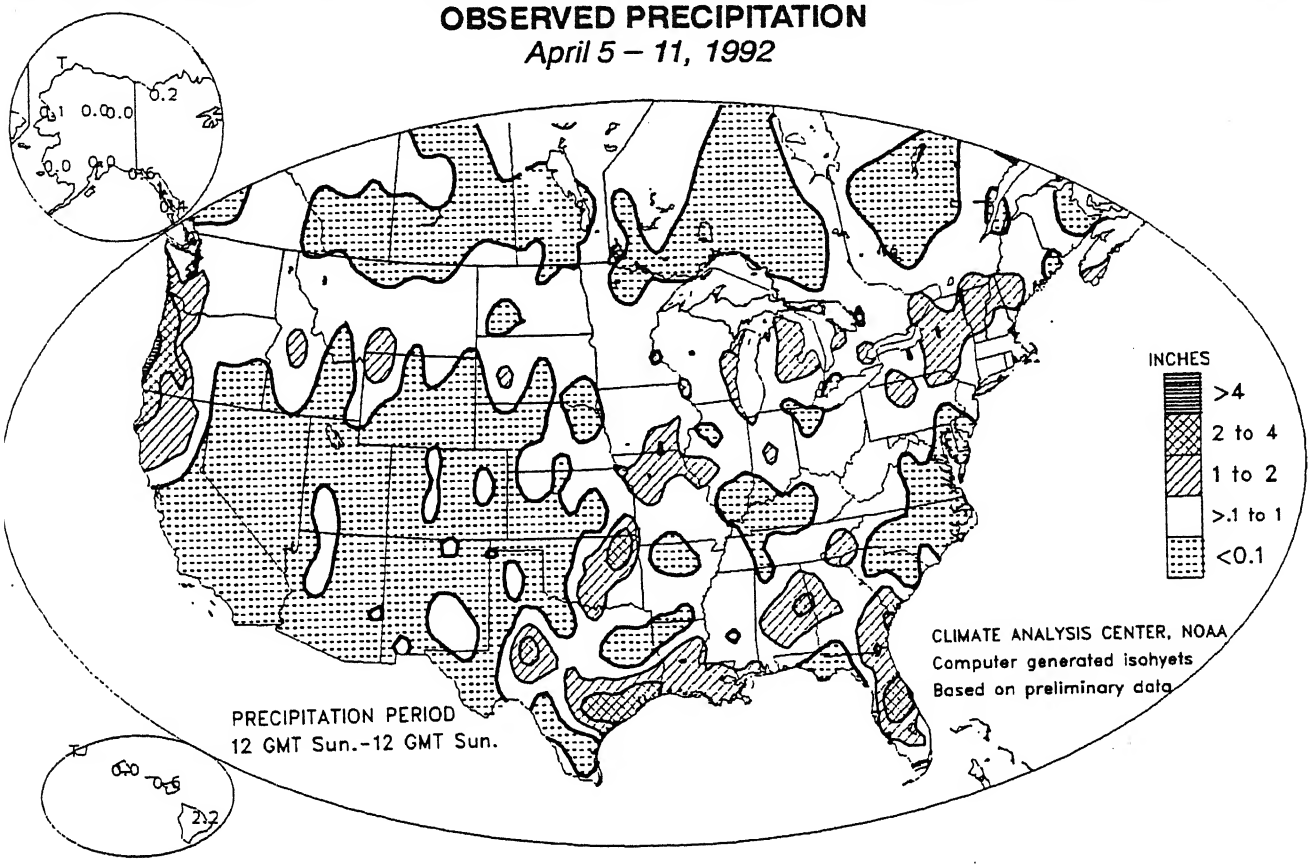
Cooler than normal conditions gripped the northern tier of states from Washington to North Dakota, through the Northeast, and along the south Atlantic Coast, with weekly departures of –4°F to –8°F common. Near to slightly below normal temperatures were observed in the southern Appalachians, eastern Florida, the west–central Gulf Coast, and portions of the Rio Grande Valley. In Alaska, unseasonably cold weather occupied the eastern half of the state, with weekly departures to –7°F reported at Gulkana.

ABLE 1. *SELECTED STATIONS WITH 1.75 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF APRIL 5 – 11, 1992*

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
ORLANDO, FL	5.39	DAYTONA BEACH, FL	2.18
EUGENE, OR	3.63	PORT ARTHUR, TX	2.12
NORTH BEND, OR	3.30	VALDEZ, AK	1.82
CAPE CANAVERAL AFS, FL	2.87	VICTORIA, TX	1.81
GALVESTON, TX	2.77	ASTORIA, OR	1.79
SAVANNAH/HUNTER AFB, GA	2.50	HOUSTON/ELLINGTON AFB, TX	1.77
HILO/LYMAN, HAWAII, HI	2.22	QUILLAYUTE, WA	1.76

OBSERVED PRECIPITATION

April 5 – 11, 1992



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

April 5 – 11, 1992

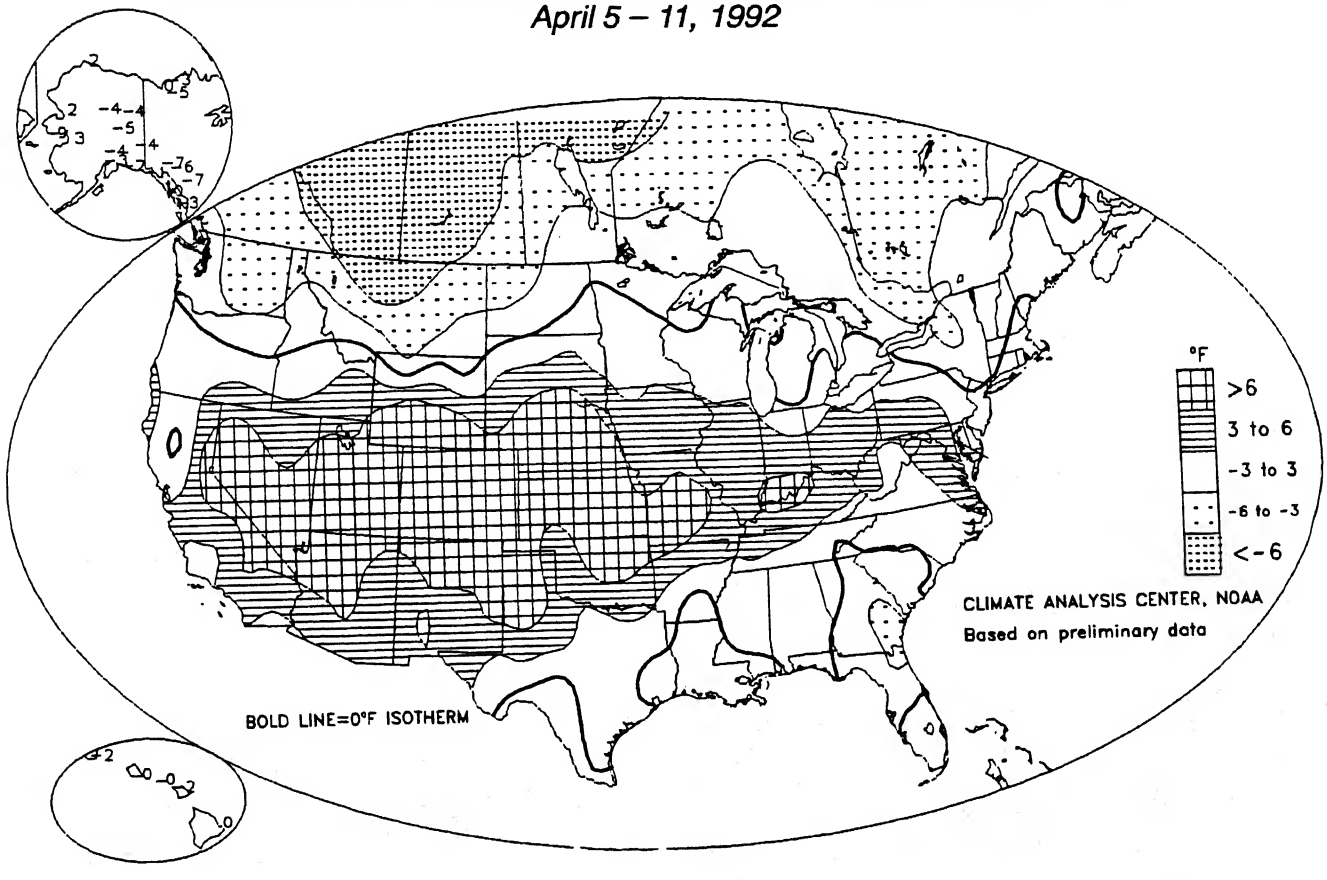


TABLE 2. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 8.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF APRIL 5 – 11, 1992*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
GRAND JUNCTION, CO	+11.2	60.4	PONCA CITY, OK	+8.6	65.0
AKRON, CO	+10.8	54.5	GRAND ISLAND, NE	+8.6	55.8
TRINIDAD, CO	+10.6	57.9	TONOPAH, NV	+8.6	54.2
LARAMIE, WY	+10.4	45.3	RENO, NV	+8.5	53.3
DENVER, CO	+10.2	55.3	PHOENIX, AZ	+8.4	74.5
COLORADO SPRINGS, CO	+10.2	53.9	NORTH PLATTE, NE	+8.3	53.3
CLAYTON, NM	+10.0	59.1	SPRINGFIELD, MO	+8.2	61.9
NOME, AK	+9.8	24.1	ALAMOSA, CO	+8.2	46.8
CEDAR CITY, UT	+9.6	54.6	NORFOLK, NE	+8.1	53.8
ROCK SPRINGS, WY	+9.2	46.6	LANDER, WY	+8.1	48.0
CHEYENNE, WY	+8.9	48.3	FLAGSTAFF, AZ	+8.1	48.0
JOPLIN, MO	+8.7	64.8	ELY, NV	+8.1	47.1
LINCOLN, NE	+8.7	56.9	SALINA, KS	+8.0	60.1
GOODLAND, KS	+8.7	55.0			

TABLE 3. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 3.5°F OR MORE BELOW NORMAL FOR THE WEEK OF APRIL 5 – 11, 1992*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
GREAT FALLS, MT	–8.3	32.0	BILLINGS, MT	–4.3	37.9
CUT BANK, MT	–7.4	28.8	NORTHWAY, AK	–4.2	19.7
GULKANA, AK	–7.1	20.5	WILLISTON, ND	–4.1	34.7
HAVRE, MT	–6.5	33.8	SPOKANE, WA	–4.1	39.9
FAIRBANKS, AK	–6.0	19.9	FT YUKON, AK	–4.0	13.6
LEWISTOWN, MT	–5.5	31.6	BETTLES, AK	–3.9	13.5
BIG DELTA, AK	–5.1	21.8	KENAI, AK	–3.9	26.9
GLASGOW, MT	–5.1	34.9	JACKSONVILLE, FL	–3.9	63.6
YAKIMA, WA	–5.1	42.3	MINOT, ND	–3.7	34.0
TALKEETNA, AK	–4.7	25.3	KETCHIKAN, AK	–3.7	38.2
WENATCHEE, WA	–4.7	44.9	ROME/GRIFFISS AFB, NY	–3.7	39.4
BRUNSWICK, GA	–4.6	60.8	MISSOULA, MT	–3.6	38.3

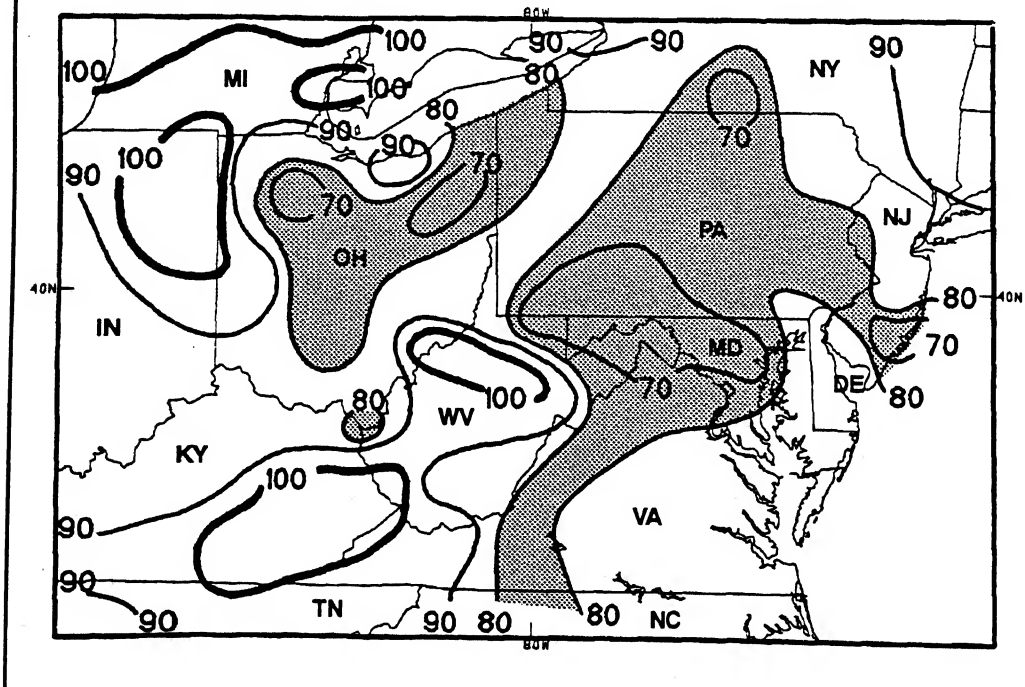
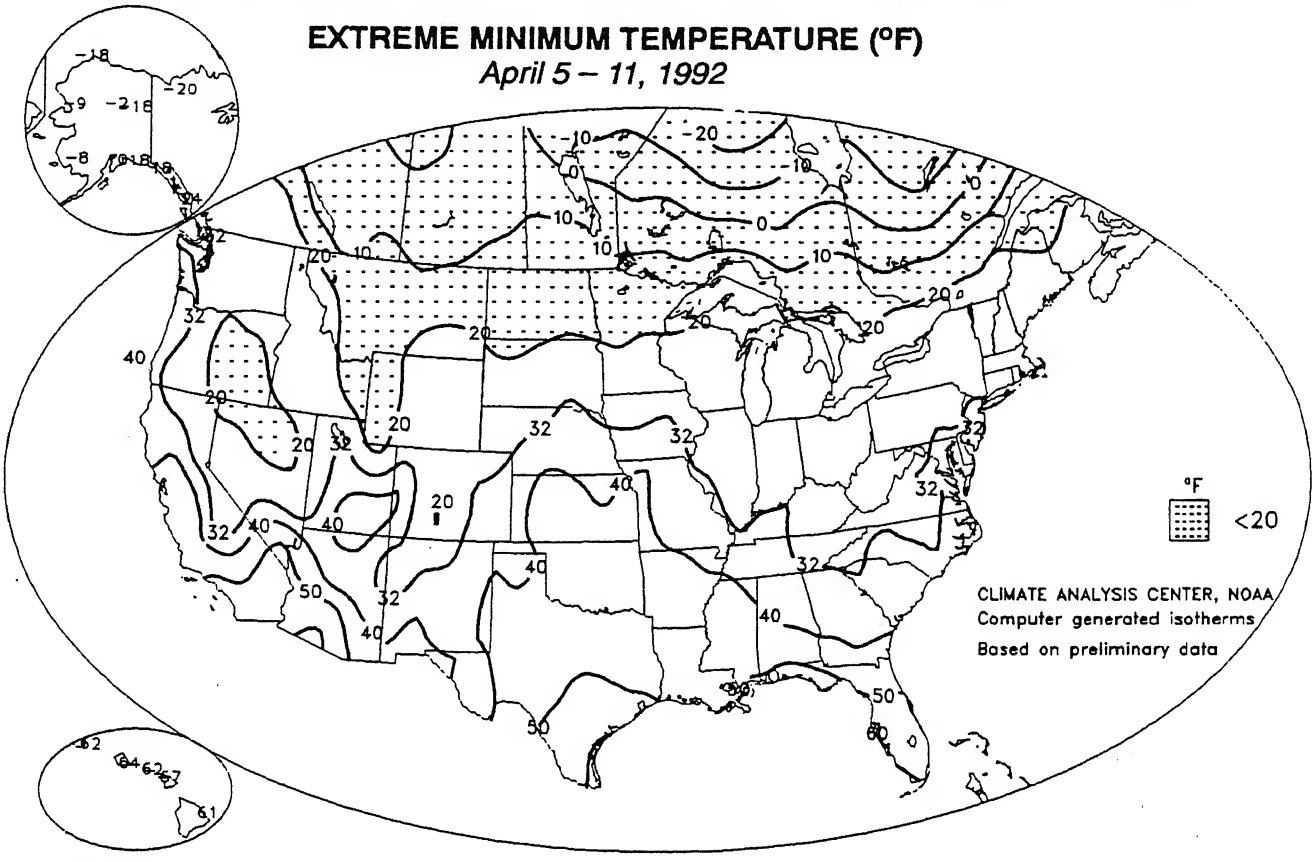


FIGURE 1. Percent of Normal Precipitation, May 1, 1991 – April 11, 1992. Isopleths drawn only for 100%, 90%, 80%, and 70%. Shaded areas received less than 80% of normal precipitation during the 347–day period. *The precipitation deficits that began accumulating as the 1991 growing season commenced were not eliminated by the 1991–1992 cold season's precipitation across much of Ohio and the mid–Atlantic, where many areas have measured 8 to 12 inches less than normal totals since May 1991. Some of the precipitation across the mid–Atlantic, however, was rather timely as the region's long–term moisture levels, as determined by the Palmer Drought Index, remained near normal during the Autumn and Winter. In contrast, central and eastern Ohio have experienced severe to extreme Palmer drought for nearly a year, and pockets of moderate to severe Palmer drought have begun to re–develop across the mid–Atlantic.*

EXTREME MINIMUM TEMPERATURE (°F)

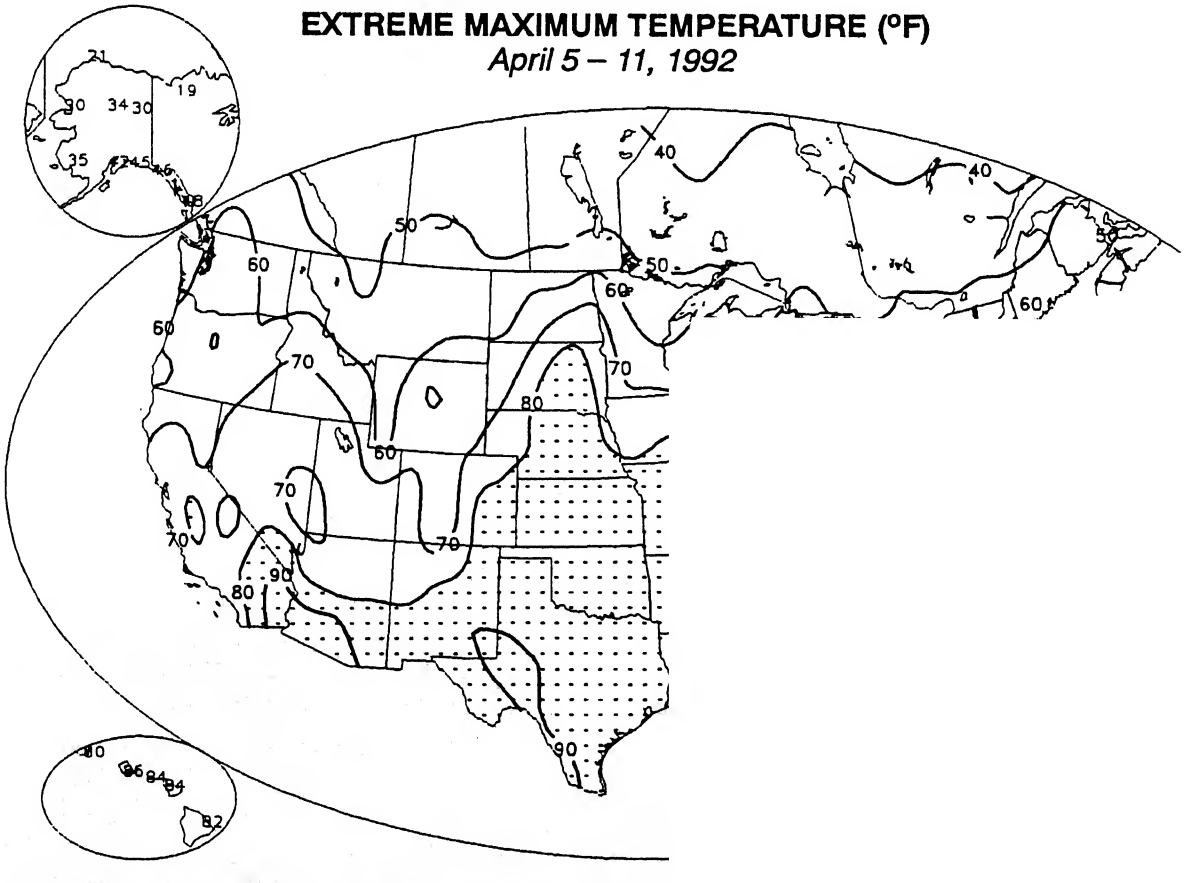
April 5 – 11, 1992



Subfreezing temperatures reached southward into the southern Great Basin and southern Appalachians, but readings below 20°F were limited to the northern Great Basin, north–central states, and extreme northern Maine (top). In contrast, temperatures in the eighties stretched northward to South Dakota and were widespread across much of the Plains and Southeast (bottom). Parts of the mid–Atlantic, central Appalachians, and northern Great Plains saw both subfreezing lows and highs in the eighties during the week.

EXTREME MAXIMUM TEMPERATURE (°F)

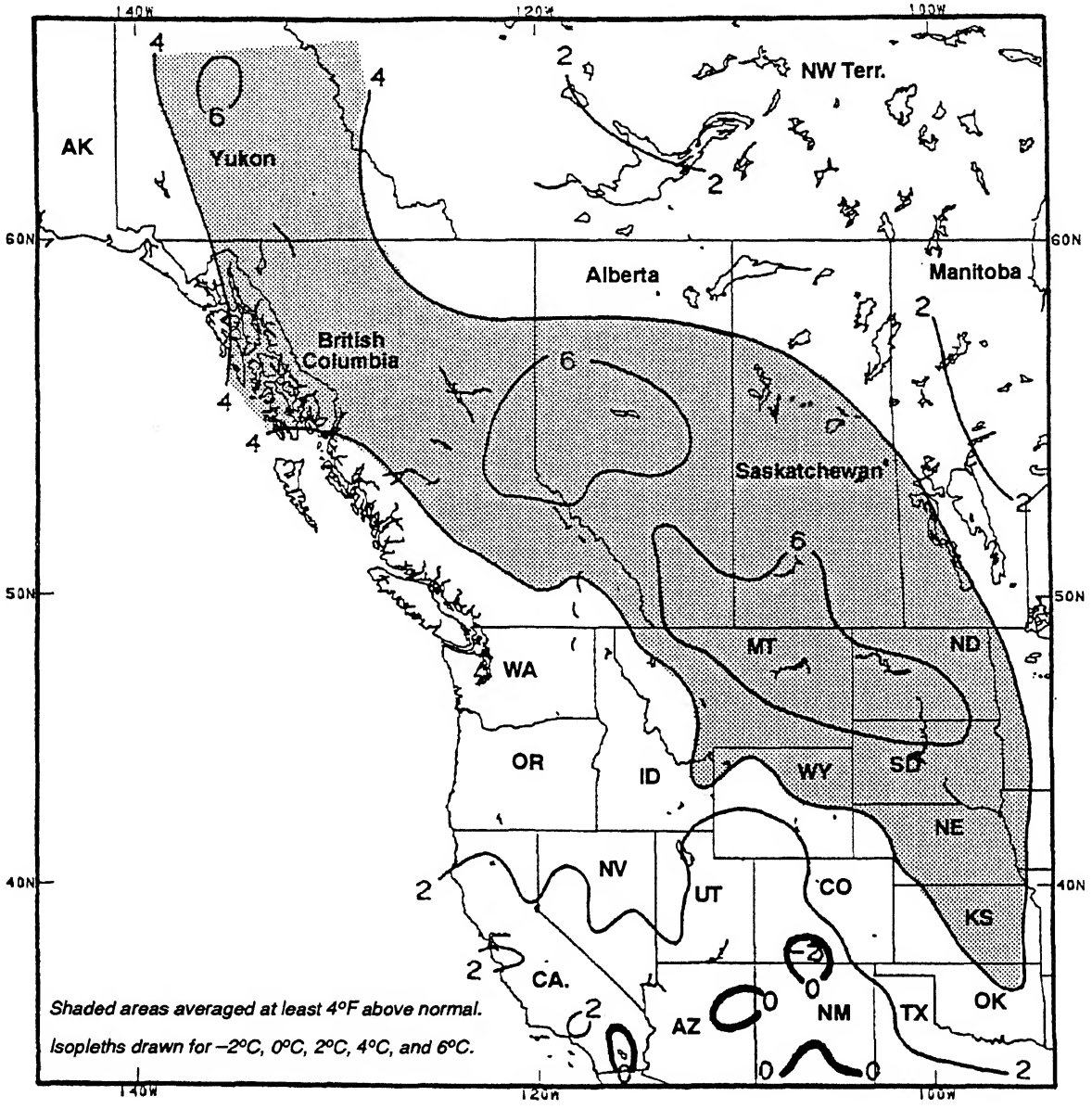
April 5 – 11, 1992



GLOBAL CLIMATE HIGHLIGHTS FEATURE

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°C)

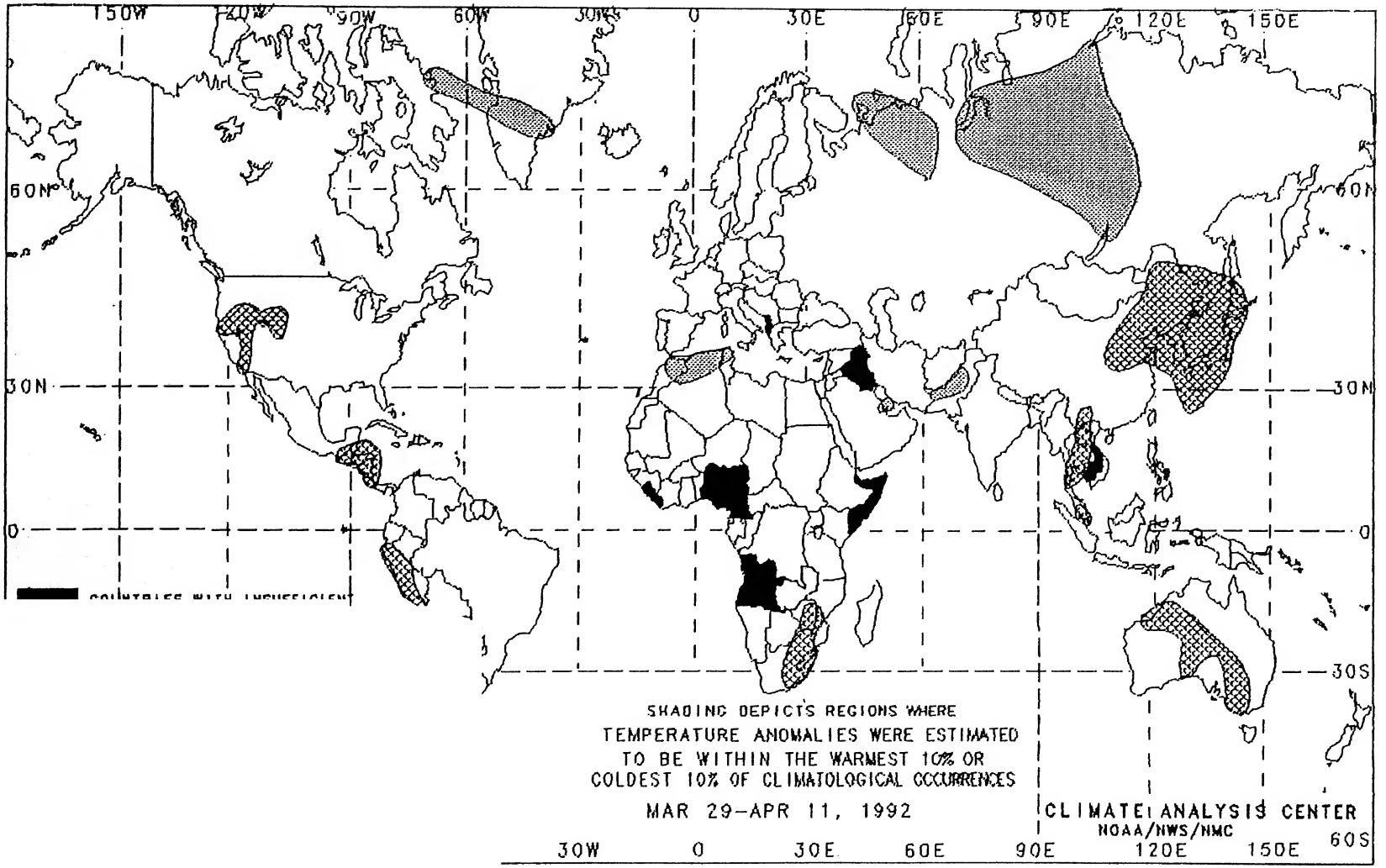
December 1, 1991 – April 11, 1992



Since the beginning of the 1991–1992 meteorological Winter nearly three and a half months ago, exceptionally mild conditions have dominated most of western North America, especially southwestern Canada and the northern High Plains. Several areas from the Yukon southeastward through parts of British Columbia, Alberta, Montana, and the Dakotas have averaged more than 6°C above normal during the 102–day period. Several monthly average and extreme temperature records were established in the northern Plains as readings soared to over 20°C in mid–Winter. The warmth from the Yukon southeastward into southern Alberta and Saskatchewan corresponds well with the typical pattern of abnormally high December – March average temperatures observed during low–index (warm) ENSO episodes in those areas. The persistently mild conditions in the American Plains may also be connected to the current ENSO episode, but the historical correlation between the two events is not as strong as it is farther to the northwest.

2–WEEK GLOBAL TEMPERATURE ANOMALIES

MARCH 29 – APRIL 11, 1992



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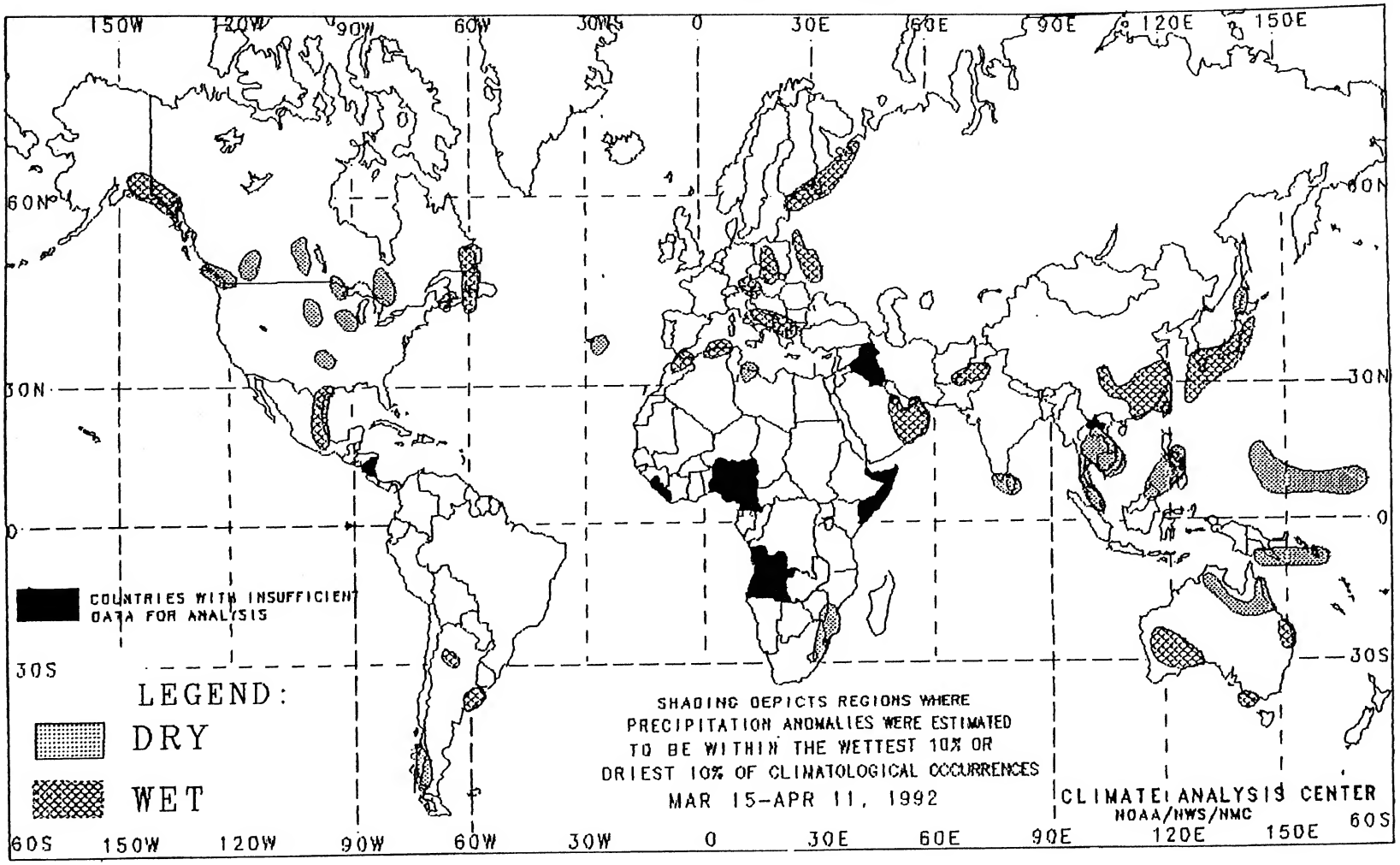
In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

...ure

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

MARCH 15 – APRIL 11, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

Western Regional Climate Center, Reno, NV
Contact: K. Redmond Phone: (702) 677–3139

Information compiled from:
Soil Conservation Service, Bureau of Reclamation,
State Climate Offices, California Dept. of Water Resources,
National Climatic Data Center, and Press Reports

and

Analysis and Information Branch
Climate Analysis Center, NMC
National Weather Service, NOAA

SUMMARY OF THE 1991–1992 RAINY SEASON IN THE FAR WEST

The first several months of the western North America rainy season (October 1991 – January 1992) brought above normal (and briefly excessive) precipitation to southern California while most locations from Los Angeles northward experienced the sixth consecutive drier than normal October – January period. Early in the wet season, the dryness became severe enough to engender the rapid development and spread of large wildfires in parts of Washington, the northern Intermountain West, and the Oakland area. In addition, gusty winds picked up dust from dry, fallow fields in the San Joaquin Valley, reducing visibilities to near zero on I–5 near Coalinga, CA and leading to a deadly 104–vehicle pile–up [for more information on the first four months of the rainy season, see Weekly Climate Bulletin #92/05, dated February 1, 1992].

Through the end of the 1991–1992 western North America rainy season, the drought has abated in some places, remained the same in others, and intensified in still others. Either very wet or very dry conditions prevail in different parts of the West (Front Cover; Figure 1).

An unusual precipitation pattern in California left coastal and southern regions with near to above normal amounts, and northern and eastern portions of the state with drier than normal conditions (Front Cover; Figures 1, 2, and 3). Although a strong subtropical upper–level jet stream coincided with a mid–latitude ridge along the West Coast for most of the wet season, the mid–level flow pattern occasionally formed a trough off the West Coast during February and March, steering Pacific moisture and abundant precipitation throughout the southern three–quarters of the state (Figure 4). In the coastal ranges and

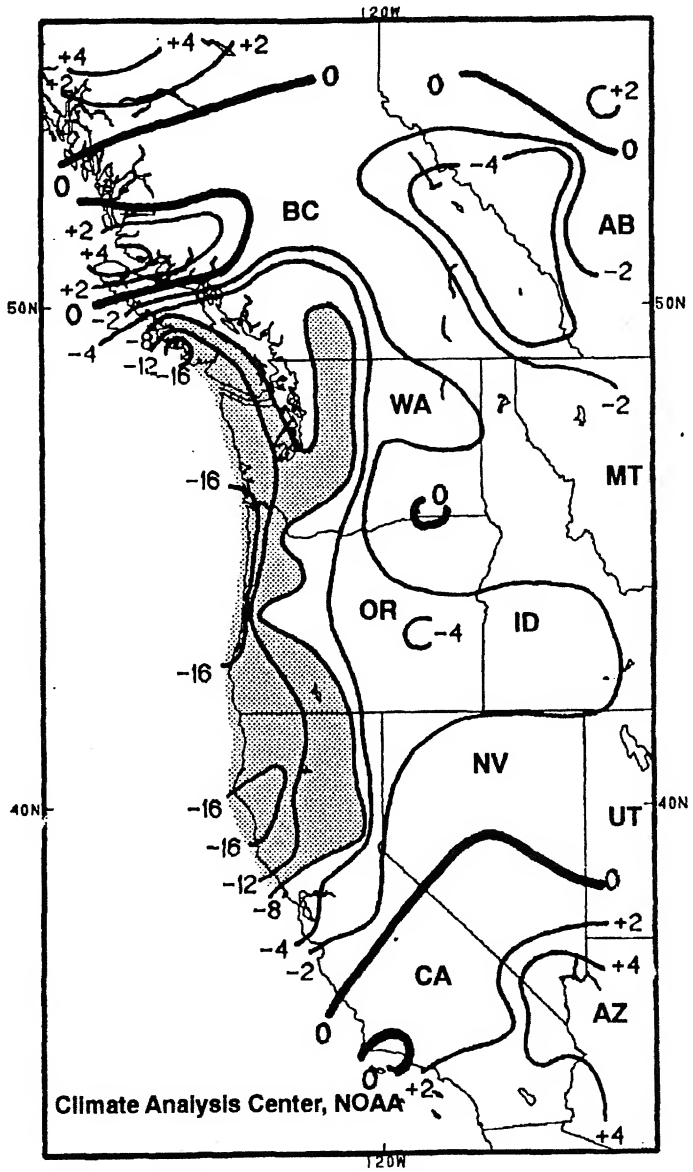


FIGURE 1. Departure from Normal Precipitation during October 1, 1991 – April 11, 1992. Isopleths drawn only for –12, –10, –8, –4, –2, 0, 2, and 4 inches. Shaded areas measured deficits of at least 8 inches. *While abnormally heavy precipitation regularly drenched the desert Southwest and parts of British Columbia, sizable precipitation shortages of 8 to 17 inches accumulated from northern California northward through western sections of Oregon, Washington, and Vancouver Island.*

across the southern tier of the state, reservoirs that rely on local precipitation to meet water needs have recovered to adequate levels, although most are still below normal. Much of the rain that falls in southern California drains immediately into the Pacific Ocean, but the 1991–1992 rainy season's precipitation will be able to support about 2 million of the 14 million individuals that live in the region.

The Marin County Municipal Water District (north of San Francisco) reports reservoirs full for the first time in five years, with 104 percent of normal, assuring the region of an ample supply of water for the next two years. Other districts in the San Francisco Bay area received enough water to last the year, although some locations must accomplish this with the help of voluntary conservation, mandatory water rationing, and/or purchases from other sources.

Farther south, mandatory conservation programs are being suspended in coastal communities from Monterey to Santa Barbara. Two recently constructed desalinization plants in the area are to be tested, but will be placed in standby mode for now. In the Los Angeles area, mandatory conservation has been largely replaced with more modest voluntary savings goals.

The recent precipitation in parts of California has led to proclamations that the drought is "over", particularly in coastal sections. This appears to be true in some areas, but in the larger sense the western drought continued through the rainy season of 1991–1992 with only minor interruptions (Figures 5 and 6 depict the 1991–1992 wet season's percent of normal precipitation and percent of normal snow water equivalent for the western river basins as of April 6, 1992). The Sierra Nevada snowpack is only at about 60% of normal. The central Sierras (near Lake Tahoe) began April with only 40%–50% of normal snowpack, well below last year at this time, making 1991–1992 the driest of the six years of drought in thast area. For the time being, snowmelt is maintaining the level of Lake Tahoe at 6121.70 feet (compared to a record low of 6121.34 feet), and this should restrict irrigation supplies along the Carson River, which is south of Tahoe and drains eastward, to approximately 35% of normal.

Toward the southwestern deserts, Las Vegas experienced the wettest month on record when March 1992 brought 4.8 inches of rain. This total exceeds the location's annual average (4.19") and the previous record for January – March precipitation (4.46" in 1980). This wetness extended across Arizona and New Mexico, both of which report widespread above normal snowpack and expect abundant stored water for the upcoming Summer. In Arizona, several desert locations received 3–5 times the normal precipitation total during the first three months of the year; however, amounts have been below normal in New Mexico during the last few weeks, which may cause some problems for dryland farmers dependent on natural precipitation as the growing season gets underway.

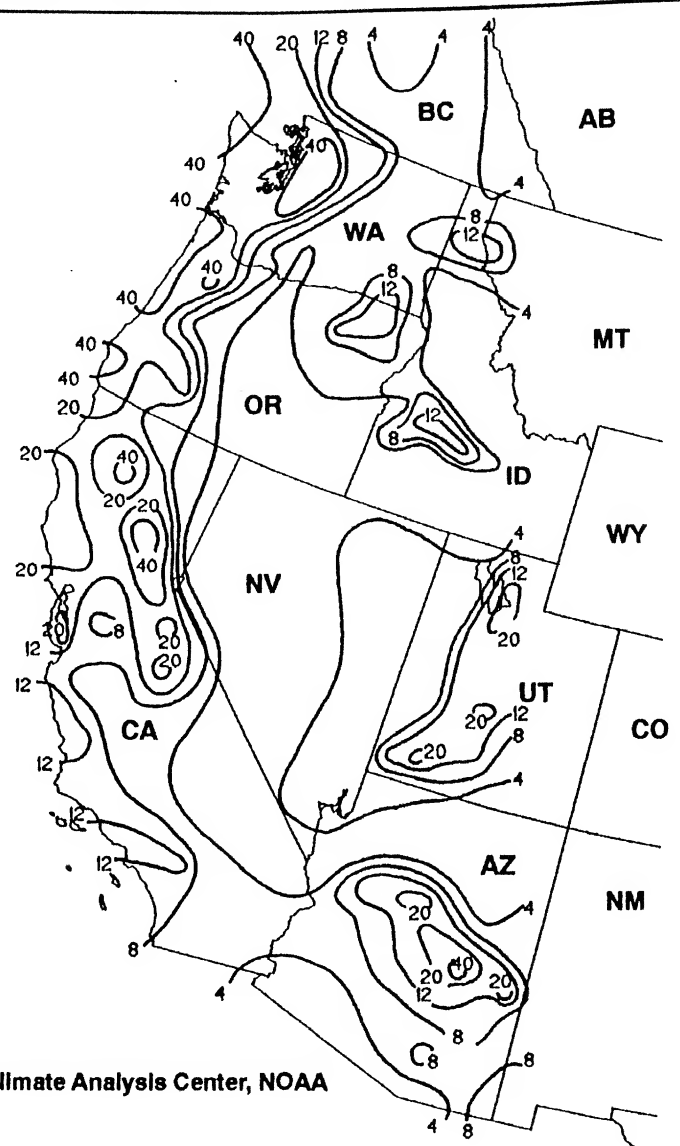


FIGURE 2. Total Precipitation during October 1, 1991 – April 11, 1992, based on reports received from the River Forecast Centers. Isopleths drawn only for 4, 8, 12, 20, and 40 inches. *A wide array of precipitation amounts were measured during the 1991–1992 rainy season in the Far West, ranging from under 4 inches in portions of western Nevada, eastern Oregon, and southern Idaho to between 40 and 55 inches in western Washington and Oregon and the higher elevations of California and the Rockies.*

In sharp contrast, the drought has worsened considerably across Oregon. Virtually no snow could be found below 5000 feet of elevation on what is typically the date of maximum snowpack. As of April 9, no basin in Oregon reported more than 29% of normal snow water content, and a few had 1% or less (Figure 6). Crater Lake, at 6475 feet, measured 39 inches of snow in early April, compared to a normal of 128". Mt. Hood, at 5900 feet, observed a snow water content of 32.8", which is 49% of normal and well below the amount recorded during the severe drought of 1976–1977 (38.3"). The exceptionally deficient snowpack in Oregon is the result of both dry and warm conditions. According to the National Climatic Data Center, January – March 1992 was Oregon's 2nd warmest and 4th driest such period since 1895. According to the Oregon State Climatologist, various locations throughout the state have "missed" approximately one year's worth of rain since the dryness started in late 1986.

Irrigation reservoir storage in Oregon is only about half of what it was during the severe 1976–1977 drought (the worst on record), and many agricultural users will be left with little or no water for the Summer. Eastern Oregon typically experiences a second precipitation maximum during late spring, which may temporarily halt the need for stored water, but storages are so low that any relief will be fleeting.

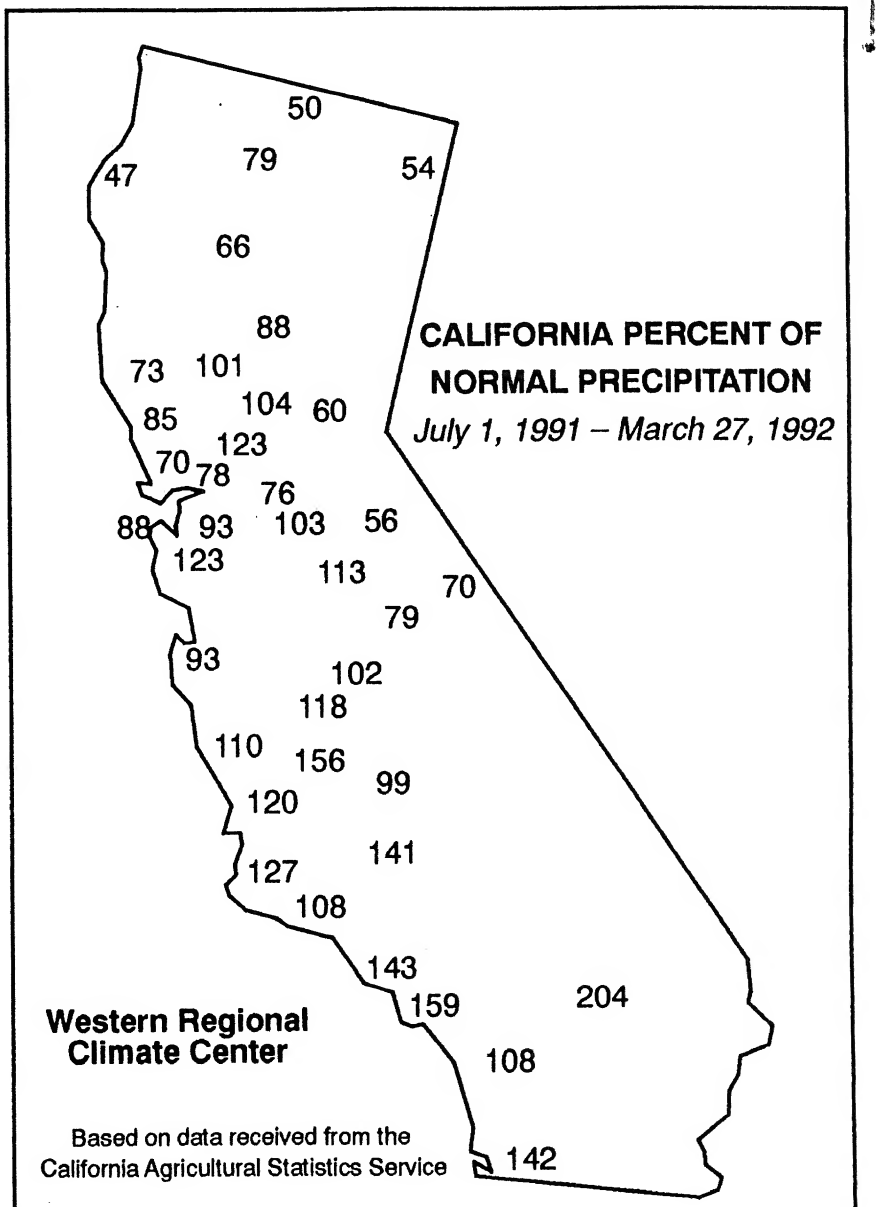


FIGURE 3. Percent of Normal Precipitation, July 1, 1991 – April 11, 1992, as compiled by the California Agricultural Statistics Service and the Western Regional Climate Center. *This was a relatively wet period for much of central and southern California due to an increase in precipitation during February and March; however, the northern part of California and most of the Sierra Nevadas were again abnormally dry.*

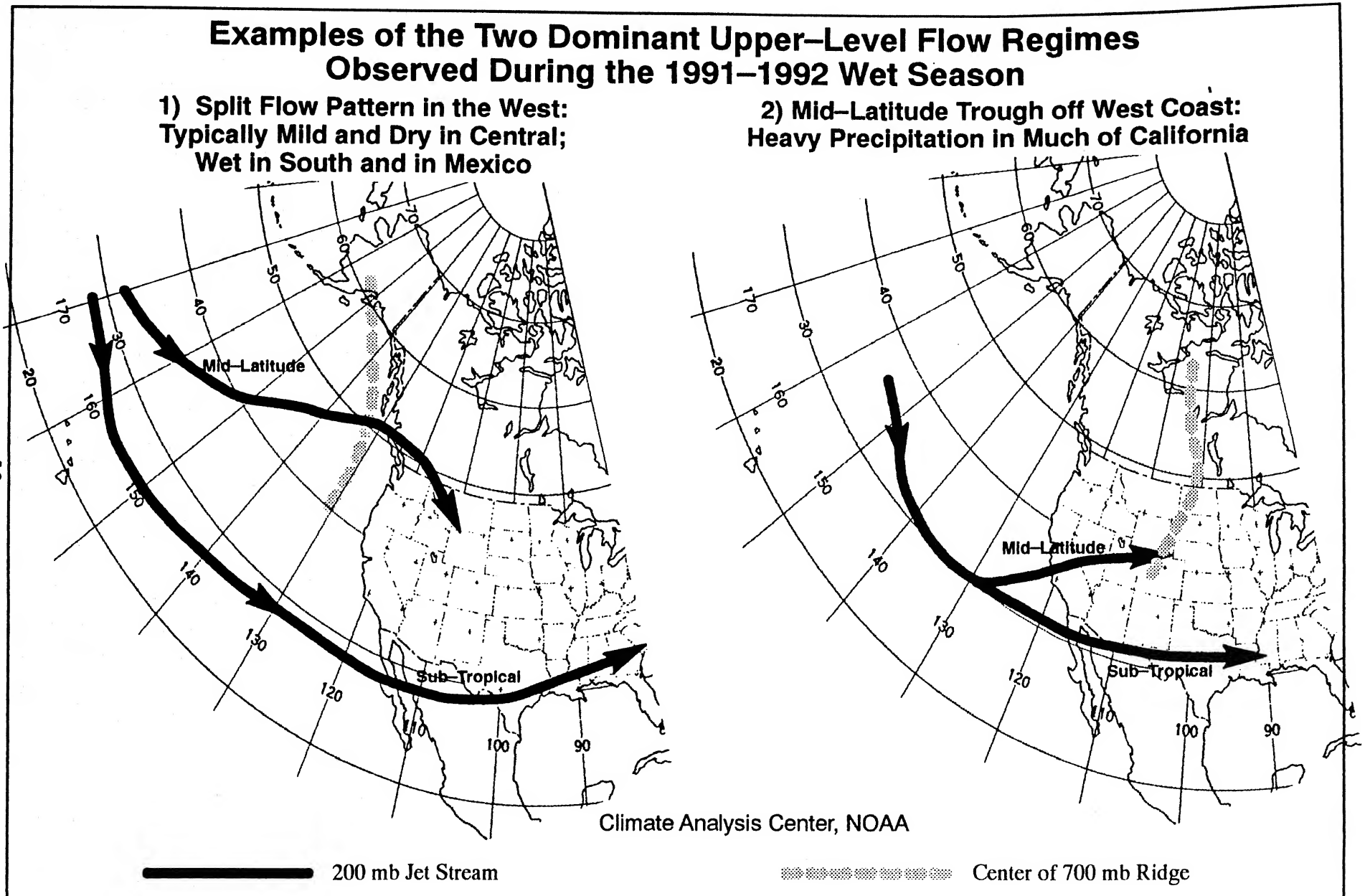


FIGURE 4. Examples of the two upper–level flow regimes that have dominated the eastern Pacific Ocean and western North America during last Winter. Both patterns preclude primarily dry weather across the interior Pacific Northwest, but the pattern depicted in example 1 also keeps northern and central California dry while the regime in example 2, which prevailed through much of February and parts of March, steers Pacific moisture and abundant precipitation into those areas.

SNOTEL UPDATE

Percent of Normal Precipitation as of April 6, 1992 for the Western River Basins

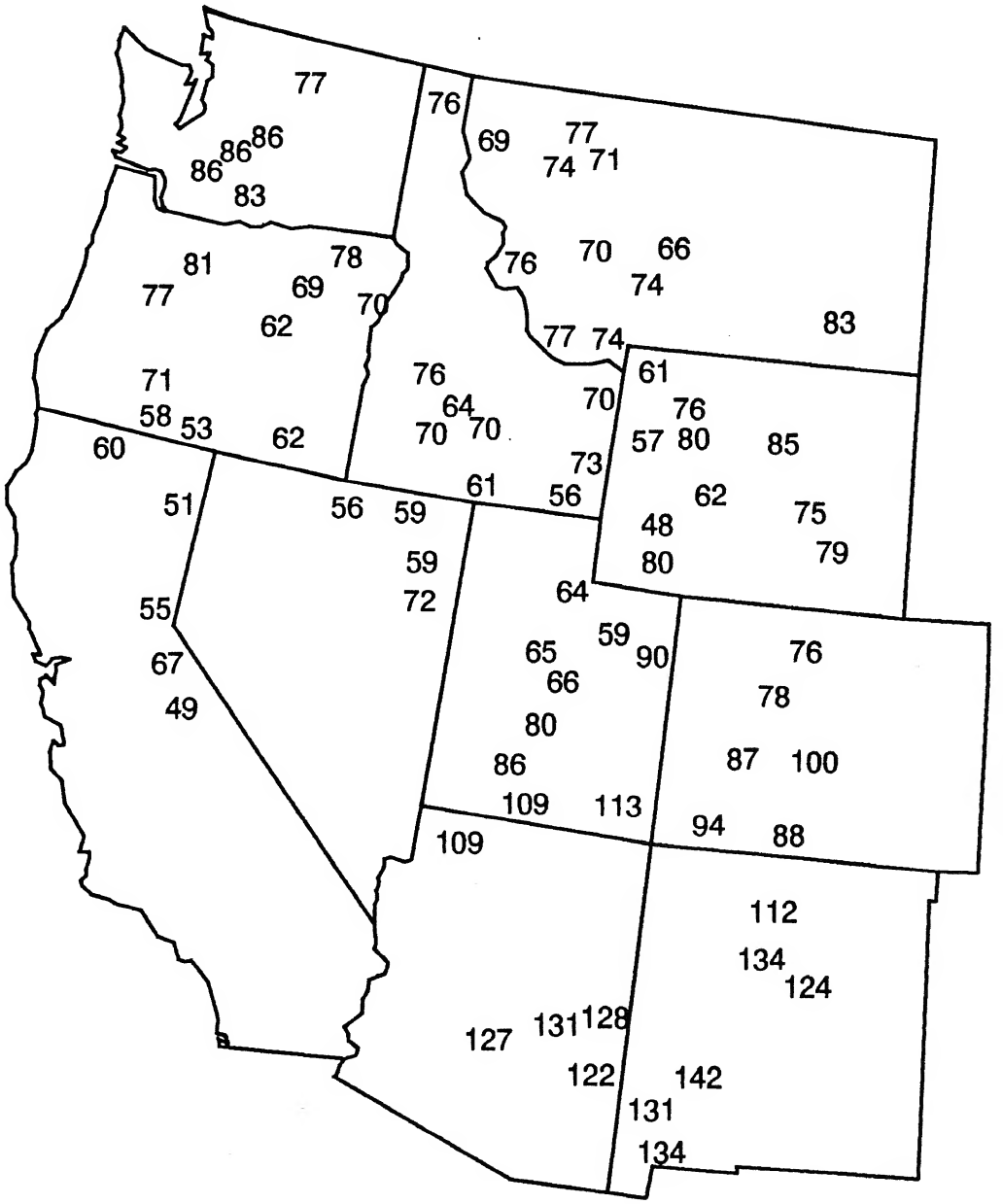


FIGURE 5. SNOTEL (SNOwf
Basins. The values shown we
by the Western Regional Clim

ercent of Normal Precipitation during October 1, 1991 – April 6, 1992 for the Western River
mountainous sites, then grouped and averaged into one value for each of the 91 river basins
e various river basins in the West received subnormal precipitation since October, except those in the southern

Western Region

SNOTEL UPDATE

Snow Water Equivalent Percent of Normal for the Western River Basins as of Apr. 6, 1992

Western Regional Climate Center

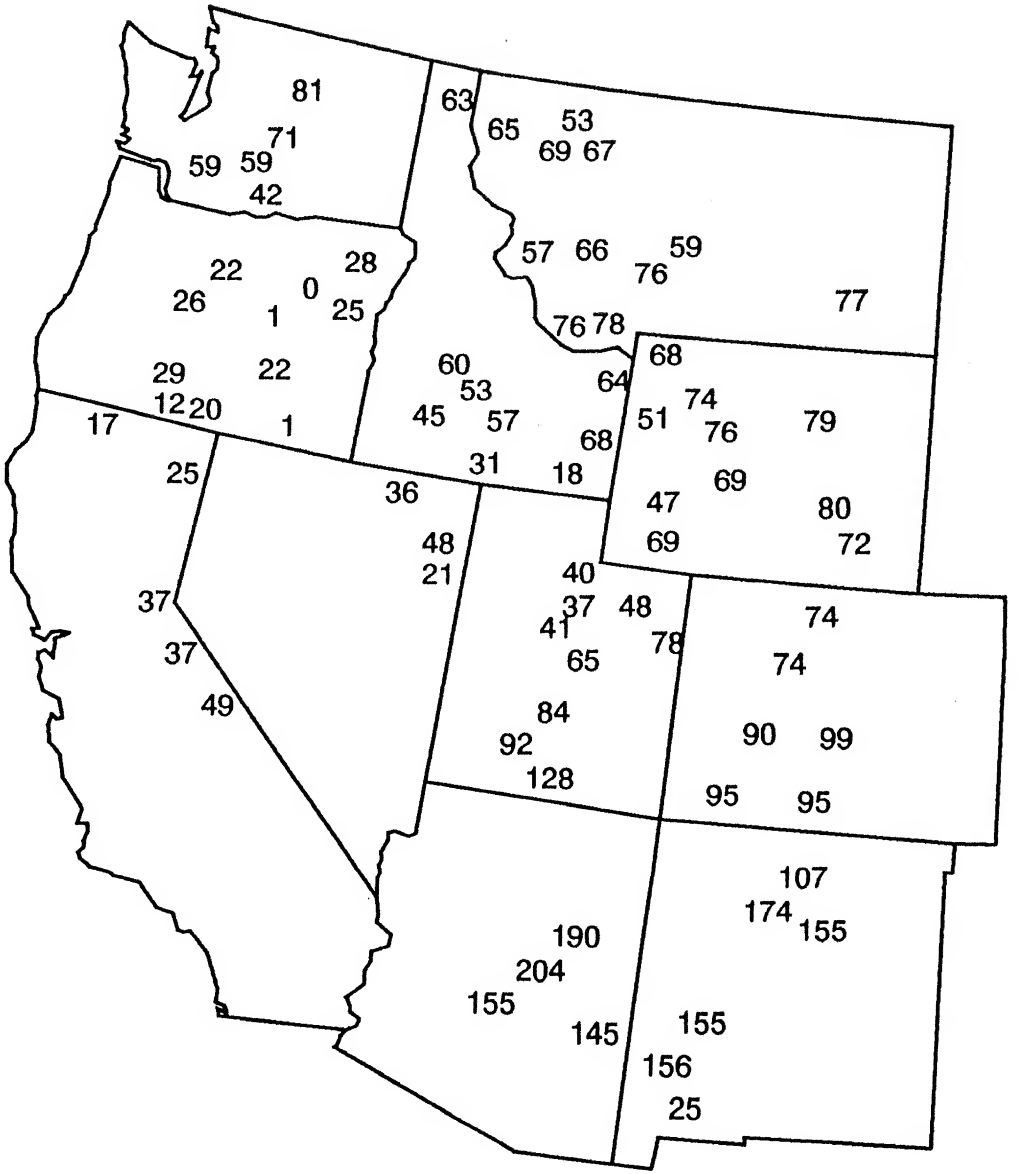


FIGURE 6. SNOTEL (SNOwfall TELemetry) Updates on the Percent of Normal Snow Water Equivalent as of April 6, 1992 for the Western River Basins. Data was collected from 560 individual mountainous sites, then grouped and averaged into their respective river basins. The values shown were collected from 560 individual mountainous sites, then grouped and averaged into one value for each of the 91 river basins by the Western Regional Climate Center, Reno, NV. *As expected, subnormal seasonal precipitation has produced well below normal snow water equivalents through most of the West as of April 6, 1992, except across the southern Rockies. Snow water equivalent is particularly deficient in northern California and eastern Oregon, where abnormally warm weather exasperated the effects of unusually low precipitation totals.*

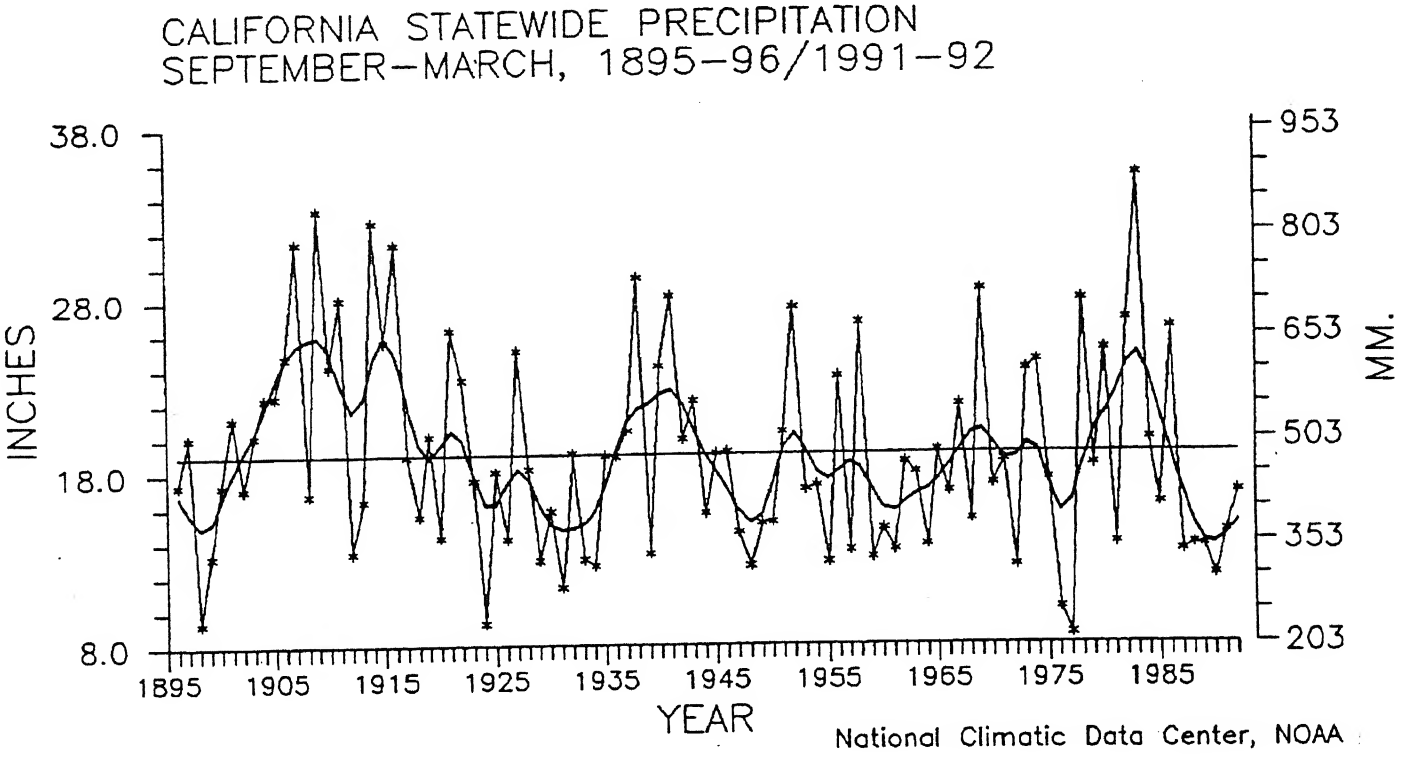


FIGURE 7. California Statewide Precipitation for September – March 1895/96 – 1991/92, as computed by the National Climatic Data Center. *The September 1991 – March 1992 period was the sixth such period in a row featuring subnormal statewide precipitation, but abnormally heavy totals in southern sections and a wet February and March across much of the state helped give 1991/1992 the wettest September – March since 1985/1986.*

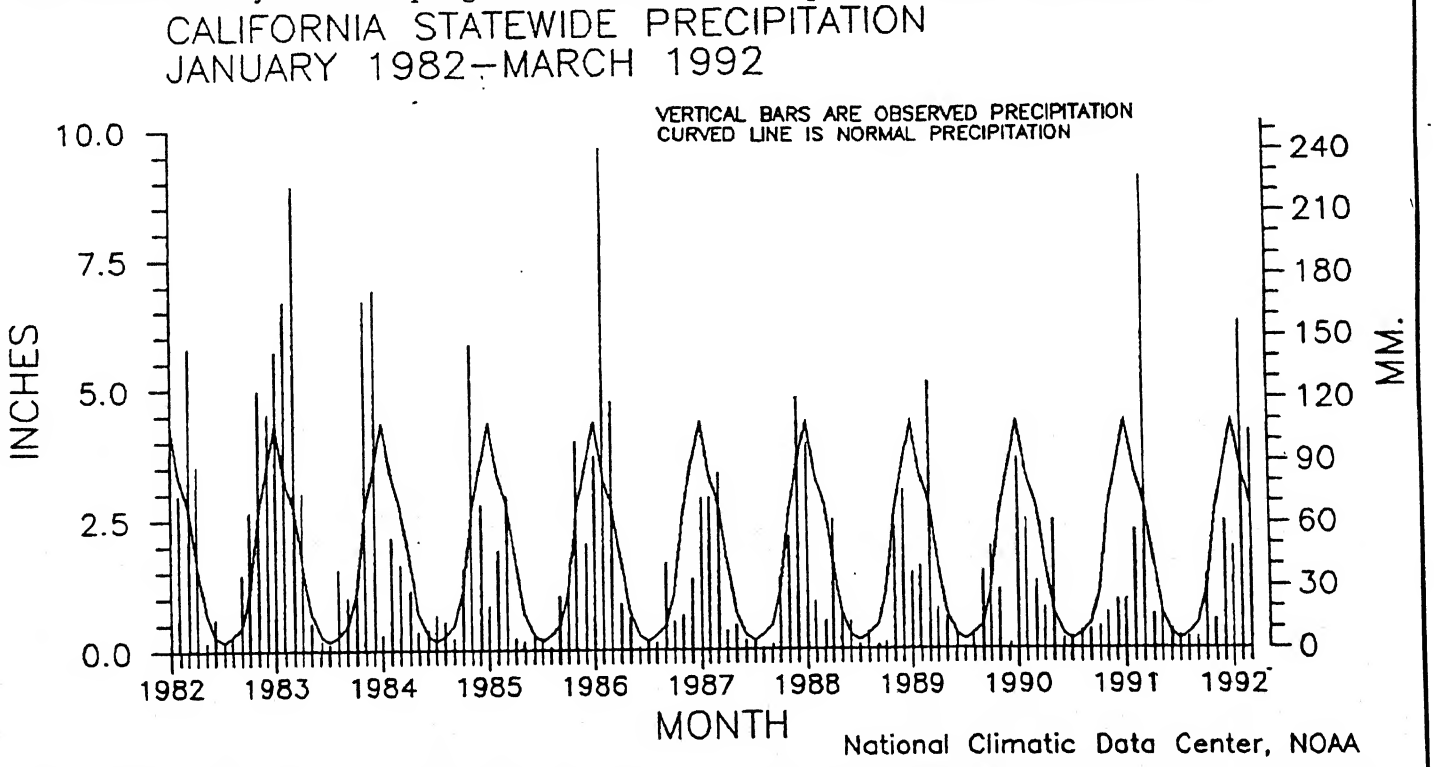
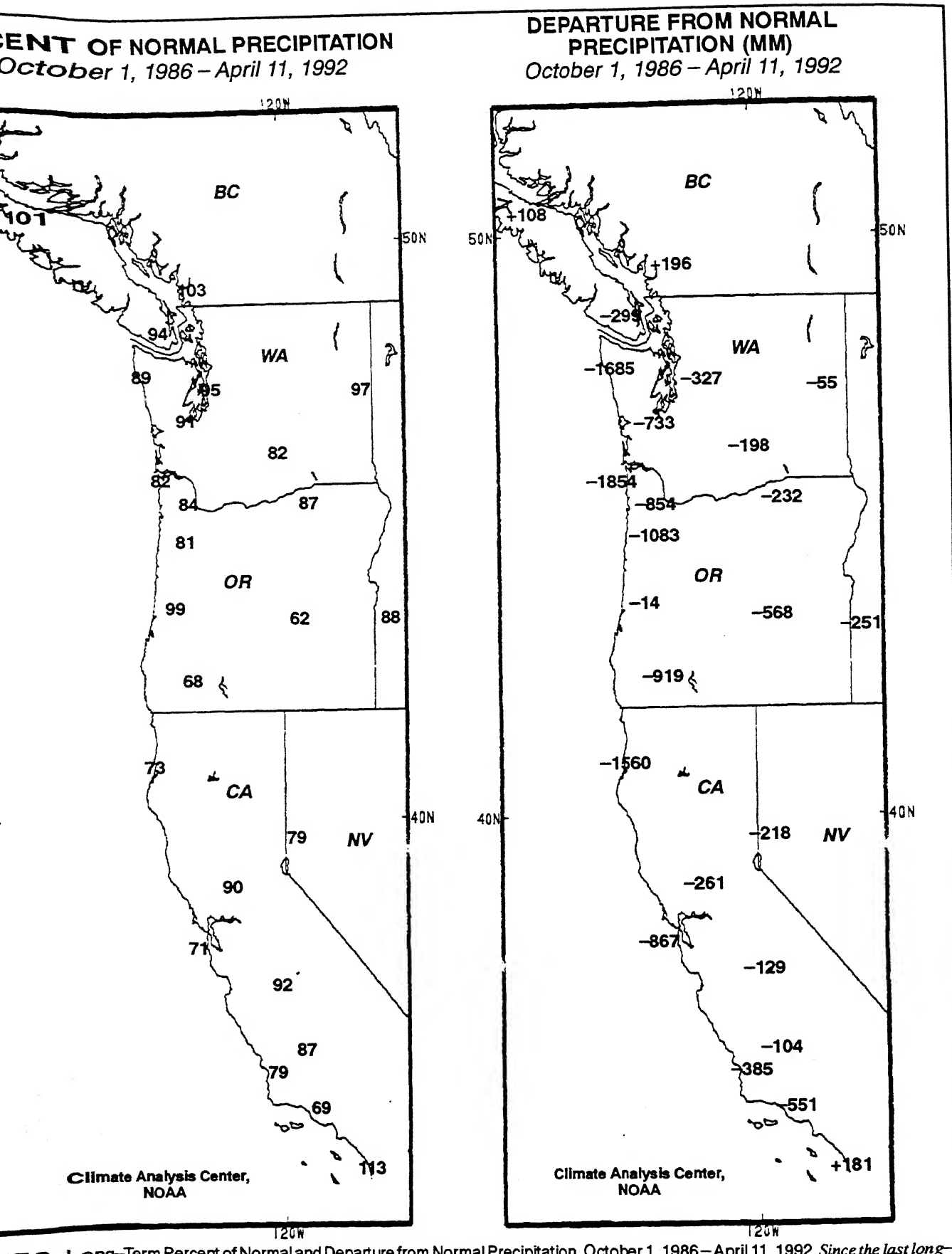


FIGURE 8. California Statewide Precipitation by Month for January 1982 – March 1992, as computed by the National Climatic Data Center. *Of the 51 wet season (September–April) months that have passed since the California drought unofficially began in October 1986, February and March 1992 were only the eleventh and twelfth months, respectively, with considerably above normal statewide precipitation.*



RE 9. Long–Term Percent of Normal and Departure from Normal Precipitation, October 1, 1986–April 11, 1992. *Since the last long–update, which covered October 1986 – January 1992 [see Weekly Climate Bulletin #92/05, dated February 1, 1992], precipitation deficits & considerably in California south of the Cascades, but increased somewhat in Oregon and Washington, especially along the coast.*

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 92/04

issued by

DIAGNOSTICS BRANCH

CLIMATE ANALYSIS CENTER, NMC

APRIL 10, 1992

Mature phase warm episode (ENSO) conditions continued in the tropical Pacific during March. Enhanced equatorial convection was observed in the central and eastern Pacific, and weaker than normal convection was over the Philippines, northern Australia and portions of Indonesia (Fig.1). Low-level equatorial westerly anomalies prevailed in the central Pacific, and an anomalous anticyclonic couplet was observed in the upper troposphere straddling the equator in the same region.

Anomalous oceanic features observed in March, such as the deeper (shallower) than normal thermocline in the eastern (western) equatorial Pacific (Fig. 2) and above (below) normal sea level in the eastern (western) tropical Pacific, are also characteristic of the mature phase of warm (ENSO) episodes. The rather large temperature anomalies, both surface and subsurface along the west coast of South America (Figs. 3 and 4), indicate that the present El Niño is stronger than that observed during 1986 – 87. Given the magnitude of the anomalies and the fact that March – April is the period when SSTs reach the peak in the annual cycle in that region, it is likely that El Niño conditions will continue for the next few months.

For the central equatorial Pacific, both statistical and numerical model forecasts indicate above normal SSTs for the next several months. A continuation of above normal SSTs in that region for the next two seasons favors enhanced convection, which could adversely affect the development of the Southeast Asian/Indian monsoon.

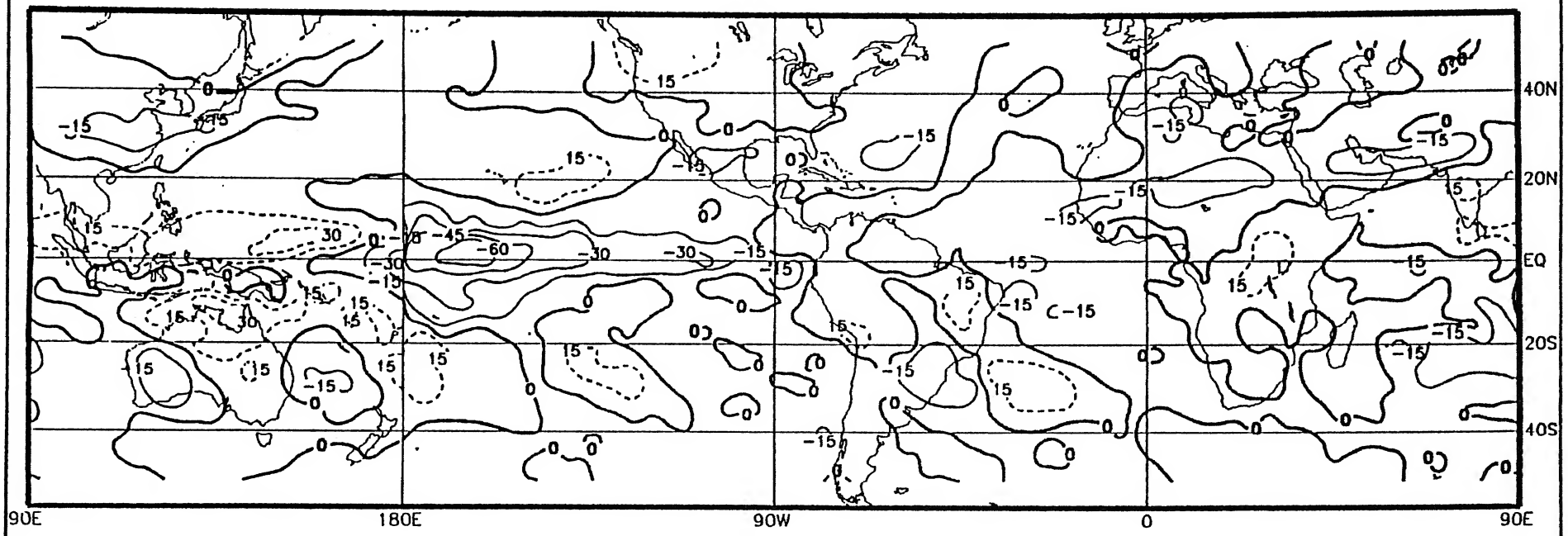


FIGURE 1. Anomalous Outgoing Longwave Radiation (OLR) for March 1992. *Anomalies are computed as departures from the 1979 – 1988 base period means. Contour interval is 15 Wm^{-2}. Positive anomalies are dashed.*

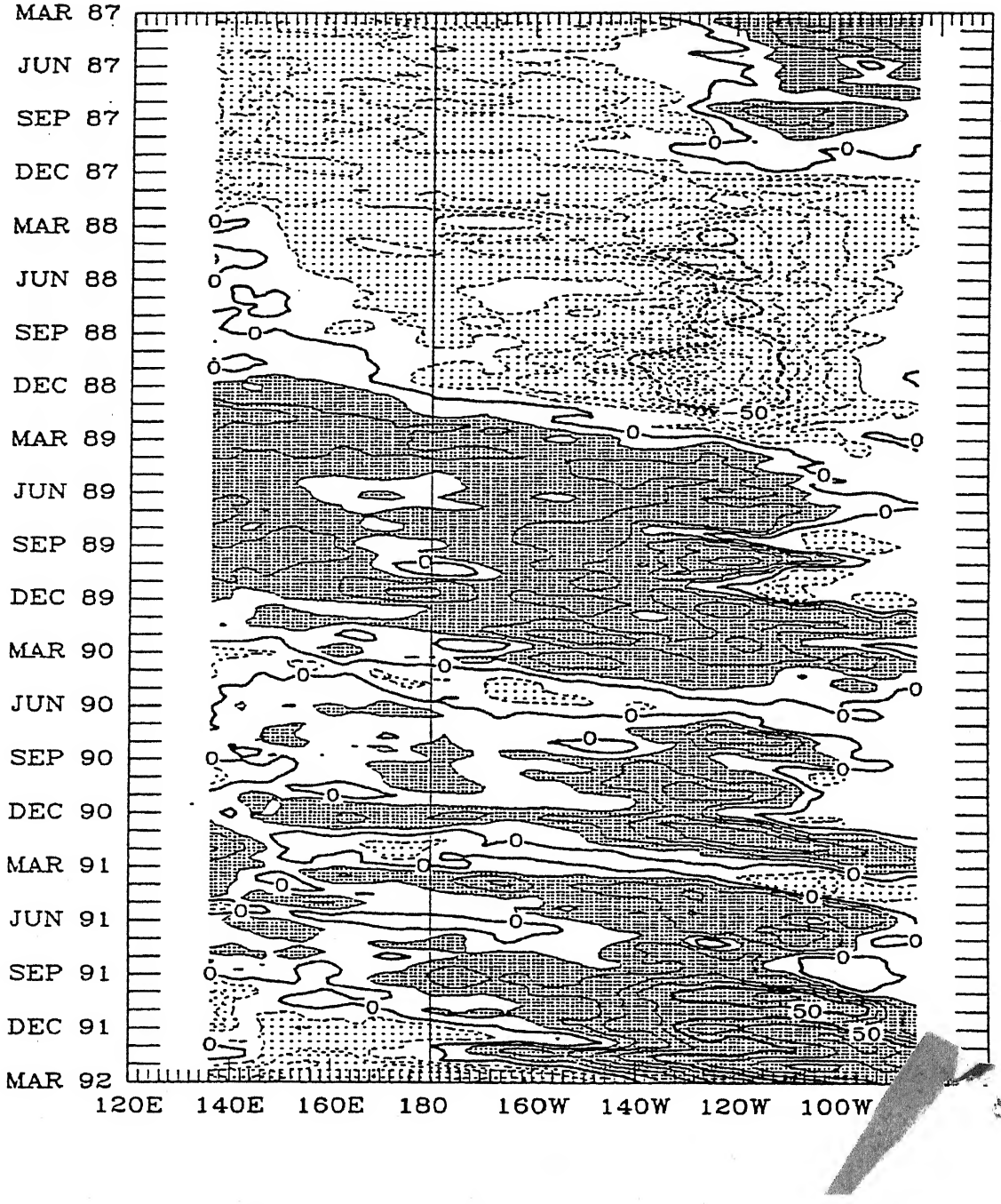


FIGURE 2. Anomalous depth of 20°C isotherm along the equator in t
from an analysis system which assimilates oceanic observations into an oceanic
dark (light) shading for the values greater (less) than 10 m (–10 m). Anomalies
1990 base period.

Sea Surface Temperature and Sea Level From Eastern Pacific GOES Stations

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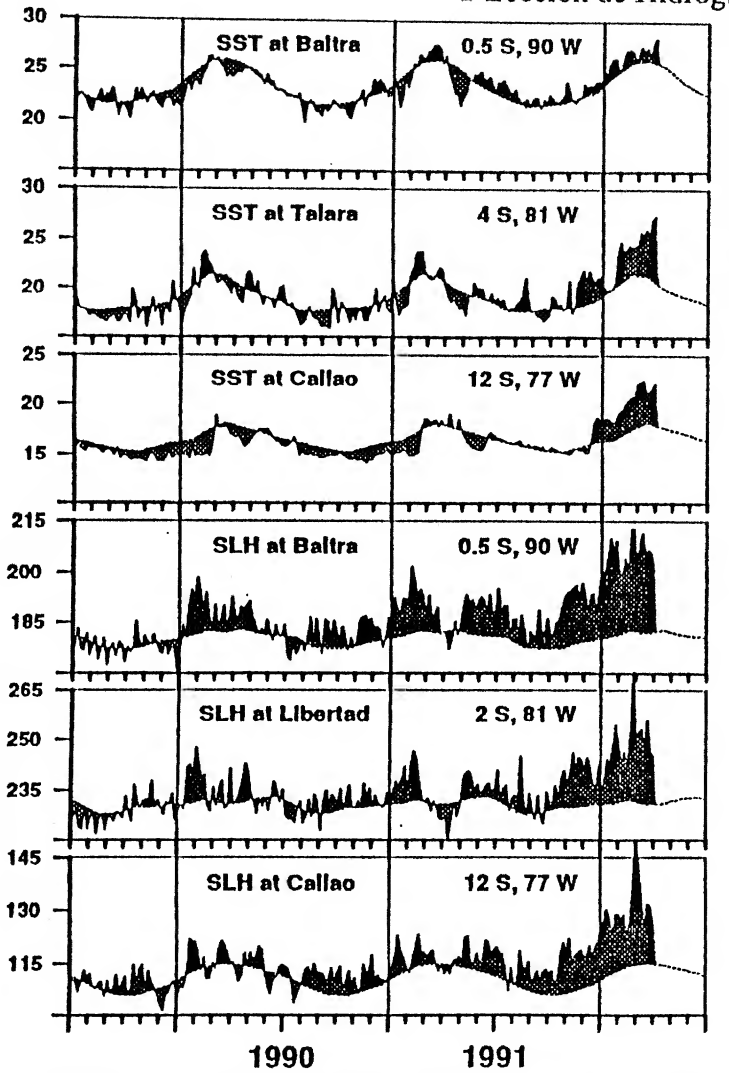
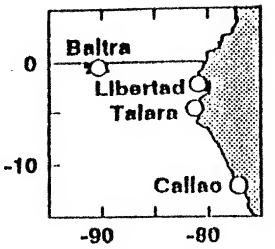


FIGURE 3 Five-day averages of sea surface temperature (SST,°C) and sea level height (SLH,cm) from GOES receiving stations in Ecuador & Peru. Dashed line and shading show climatology, departures.



Through cooperative arrangements with South American institutions, the TOGA program has maintained a network of nine tide stations and four meteorological stations in Ecuador, Peru and Chile since the mid 1980's. The stations are maintained by NOAA/AOML and the University of Hawaii. The hourly data are transmitted to down-link stations via the GOES satellite in real time and processed. The five-day averages (pentads) at critical stations give us an effective means of monitoring coastal conditions with good time resolution and compact data volume.

Monthly averaged anomalies in March were about the same or higher as in February: 17-25 cm in sea level, and SSTs of 1.5C, 5.1C, and 3.8C, respectively at Baltra, Talara and Callao. The significantly higher SSTs at Talara were due in part to generally warmer (4C) conditions and to a pulse of very warm (6C) water during the last ten days.

	Sea Sfc Temperature			Sea Level Height		
MAR	Baltra	Talara	Callao	Baltra	Libertad	Callao
4	27.3	25.7	22.2	208.8	252.6	143.4
9	27.1	25.6	22.3	211.4	253.2	133.8
14	27.2	26.0	21.3	205.8	248.4	125.3
19	26.6	25.4	21.3	206.7	255.7	131.8
24	27.5	27.0	21.5	205.8	246.8	131.1
29	28.2	27.3	22.0	200.6	245.2	125.7

Anomalies

MAR	Baltra	Talara	Callao	Baltra	Libertad	Callao
4	1.5	4.4	4.4	26.8	21.6	28.9
9	1.2	4.4	4.4	29.5	22.4	19.2
14	1.3	4.8	3.2	24.0	17.8	10.6
19	0.7	4.3	3.2	24.8	25.2	17.1
24	1.7	6.1	3.5	23.8	16.2	16.4
29	2.5	6.7	4.1	18.4	14.6	11.1

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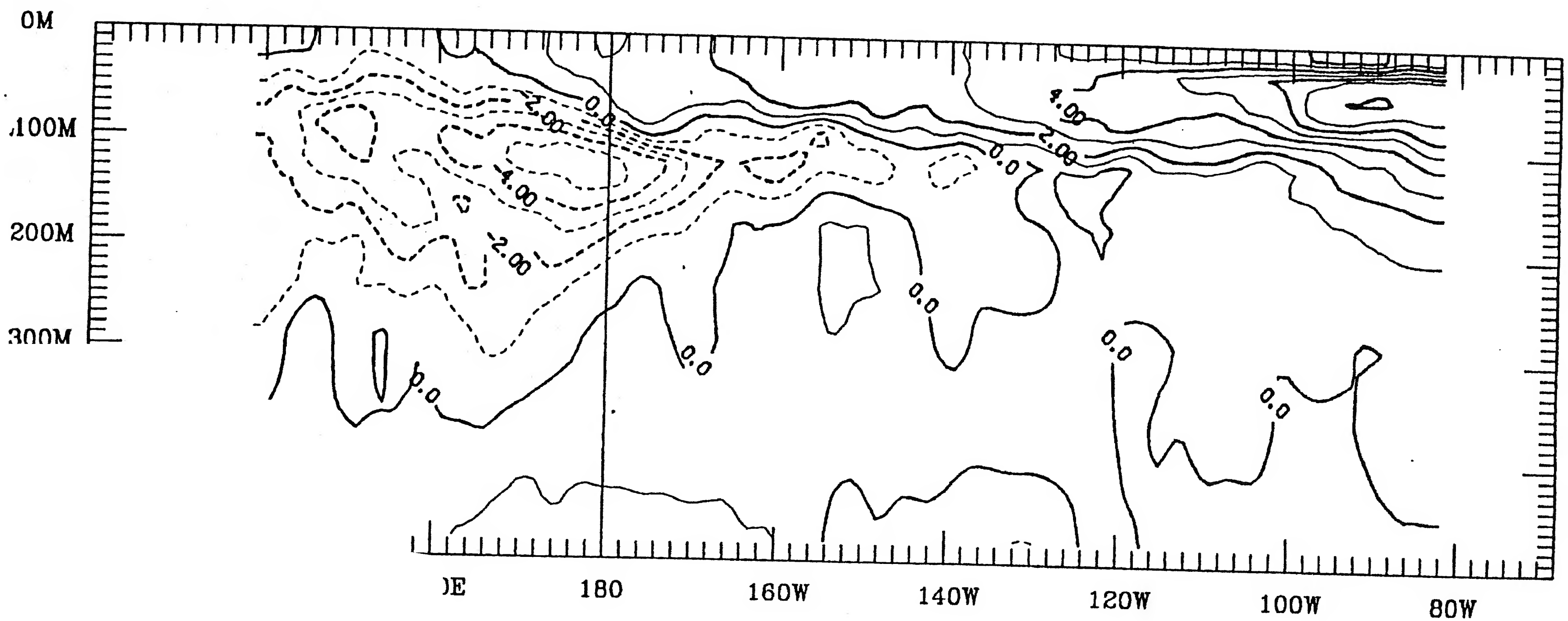

ːtion of Ocean Temperature Anomalies for the week centered on 25 March 1992. *Data was*
: 1°C. Negative anomalies are indicated by dashed contours. Anomalies are computed as departures

ATMOSPHERIC AND SEA SURFACE TEMPERATURE (SST) INDICES

DATE	SLP ANOMALIES		TAHITI-DARWIN SOI	PACIFIC 850 MB ZONAL WIND INDICES			PACIFIC 200 MB ZONAL WIND INDEX	OLR INDEX	PACIFIC SST					
	TAHITI	DARWIN		5N-5S 135E-180	5N-5S 175W-140W	5N-5S 135W-120W	5N-5S 165W-110W	5N-5S 160E-160W	NINO 1+2 0-10S 90W-80W		NINO 3 5N-5S 150W-90W		NINO 4 5N-5S 160E-150W	
MAR92	-1.6	3.1*	-3.0*	-0.5	-2.1	-1.5	-1.3	-2.1	1.2	27.3	1.3	28.2	1.0	29.1
FEB 92	-0.9	1.3	-1.4	-0.4	-1.7	-1.3	-2.2	-1.4	0.8	26.5	1.4	27.6	0.9	28.9
JAN 92	-1.6	3.9	-3.4	-1.5	-2.5	-2.3	-0.2	-2.3	0.5	24.8	1.5	27.0	0.7	28.8
DEC 91	-2.3	1.2	-2.3	-0.7	-2.2	-1.5	-1.2	-1.8	0.7	23.3	1.2	26.3	1.2	29.4
NOV 91	0.0	1.4	-0.8	-1.7	-1.4	-1.2	-0.2	-2.4	0.4	21.9	1.1	26.0	1.1	29.4
OCT 91	-1.8	0.5	-1.5	-0.1	-0.8	-1.2	-0.6	-0.3	0.4	21.1	0.8	25.7	1.2	29.6
SEP 91	-1.4	1.4	-1.8	-1.1	-1.1	-1.3	-0.4	-0.6	0.3	20.9	0.6	25.4	0.8	29.1
AUG 91	0.0	1.4	-0.9	-0.3	-0.2	0.2	0.7	-1.0	0.3	21.3	0.5	25.5	0.9	29.2
JUL 91	0.3	0.6	-0.2	-0.2	-0.5	-0.6	0.1	-0.2	0.9	22.6	1.0	26.6	0.9	29.4
JUN 91	0.1	1.0	-0.5	-0.3	-0.8	-1.1	-0.6	-0.1	0.4	23.2	1.3	27.6	0.8	29.3
MAY 91	-0.6	1.7	-1.5	-0.5	-0.7	-0.9	-1.2	-0.2	0.5	24.6	1.0	27.8	0.9	29.4
APR 91	-1.1	0.5	-1.0	-0.2	0.3	0.2	-0.6	-0.2	-0.3	25.2	0.4	27.6	0.8	29.1

* PRELIMINARY

** REVISED

TABLE T1 – Atmospheric and SST index values for the most recent 12 months. Atmospheric indices are standardized by the mean annual standard deviation except for the Tahiti and Darwin SLP anomalies which are in mb. SST indices (anomalies and means) are in degrees Celsius. Note that positive (negative) values of the 200 mb Zonal Wind Index imply westerly (easterly) anomalies; positive (negative) values of the 850 mb Zonal Wind Indices imply easterly (westerly) anomalies.